

REMARKS

Claims 1-3, 5-22, 48, and 50-60 are pending. Claims 1, 50, and 58 are amended. Applicants disagree with all rejections and makes these claim changes only to expedite prosecution and move to allowance as soon as possible. Applicants submit that the amendments introduce no new matter, support therefor being found in the original application and claims as filed (e.g. see the subject U.S. Patent Publication 2004/0242714 at [0017], [0019], [0047]-[0048], [0067]). Favorable reconsideration in light of the remarks which follow is respectfully requested.

1. 35 U.S.C. §102/103 Rejections

Callahan

Claims 1-3, 5-19, 21, 22, 48, 50-52, and 55-57 are rejected under 35 U.S.C. §102(b) or alternatively §103(a) over Callahan et al (U.S. Patent No. 4,976,897). Applicants respectfully traverse.

Applicants recite, in amended independent claim 1, a composite porous membrane comprising a hydrophobic substrate having an average pore size ranging from about 0.01 μm to about 10 μm coated with difunctional surface-modifying molecules. As set out, each difunctional surface-modifying molecule comprising a hydrophobic portion preferentially associated with the substrate and a hydrophilic portion and having an active group containing a carbon-carbon double bond. As further set out, the difunctional surface-modifying molecules consisting of a difunctional acrylate monomer with molecular weight less than 10,000 Dalton. Applicants coated membranes are coated by flowing a reagent solution comprising the difunctional surface-modifying molecules and a photoinitiator through the substrate to coat the substrate surface and inner surfaces of the pores. The surface-modifying molecules are crosslinked to form a crosslinked hydrophilic polymeric network at the substrate surface and inner surfaces of the pores of the membrane such that the pore size of the coated membrane is substantially the same as the pore size of the porous membrane before coating.

Applicants also recite, in amended independent claims 50, a composite porous membrane comprising a hydrophobic substrate having an average pore size ranging from about 0.01 μm to about 10 μm coated with difunctional surface-modifying molecules, each difunctional surface-modifying molecule comprising a hydrophobic portion preferentially associated with the substrate and a hydrophilic portion. As set out, the difunctional surface-modifying molecules comprise difunctional acrylate molecules with molecular weight less than 10,000 Dalton. As further set out, the substrate is coated by flowing a reagent solution through the substrate to coat the substrate surface and inner surfaces of the pores, the reagent solution being capable of flowing through the substrate and comprising the difunctional surface-modifying molecules and a photoinitiator.

Applicants further recite, in amended independent claim 58, a composite porous membrane consisting essentially of a hydrophobic substrate coated with ethoxylated (30) bisphenol A diacrylates having molecular weight less than 10,000 Dalton, each ethoxylated (30) bisphenol A diacrylate comprising a hydrophobic portion preferentially associated with the substrate and a hydrophilic portion, wherein the ethoxylated (30) bisphenol A diacrylates are crosslinked to form a crosslinked hydrophilic polymeric network at the membrane surface and inner surfaces of the pores.

It is respectfully submitted that Callahan clearly does not teach or suggest Applicants composite porous membranes as claimed in claims 1, 50, and 58. For example, Callahan at least does not teach or suggest a porous membrane coated by flowing a reagent solution through a porous substrate to coat the substrate surface and inner surfaces of the pores, wherein a crosslinked hydrophilic polymeric network is provided at the substrate surface and inner surfaces of the pores of the membrane such that the pore size of the coated membrane is substantially the same as the pore size of the porous membrane before coating.

Rather, according to Callahan, materials having high viscosities are used which prevents the resins from wicking up or passing into the pores (see col. 2, lines 50-65; col. 4, line 54 – col. 5, line 7; col. 6, lines 54-58; col. 8, lines 1-5). Callahan's solutions for coating porous

substrates, which have viscosities of at least 35,000 cp, preferably from 50,000-500,000 cp, are not capable of flowing through a porous substrate having a pore size ranging from about 0.01 μm to about 10 μm because Callahan's materials are much too viscous and, as specified by Callahan, the object of providing such highly viscous materials is to prevent the materials from even entering the pores. Thus, clearly Callahan's coated membranes do not contain any surface-modifying material on the inner surface of the pores.

In view thereof, it is respectfully submitted that claims 1, 50, and 58, and all claims dependent therefrom, are patentable over Callahan. Reconsideration and withdrawal of the rejection is respectfully requested.

Callahan and Steuck

Claim 20 is rejected under 35 U.S.C. §103(a) over Callahan and Steuck et al (U.S. Patent No. 4,618,533). Applicants respectfully traverse.

Steuck does not remedy the above-noted deficiencies in Callahan. Rather, Steuck is cited for allegedly describing porous membranes that include polyethylene and polyvinylidene fluoride. No combination of Callahan and Steuck would teach or suggest Applicants' coated membranes as set forth in Applicants' independent claim 1. Claim 20 depends from claim 1 and, thus, also is patentable over Callahan and Steuck. Reconsideration and withdrawal of the rejection is respectfully requested.

Witham et al.

Claims 1-3, 5-9, 12-17, 19, 21, 22, 48, and 58-60 are rejected under 35 U.S.C. §102(b), or alternatively §103(a) over Witham (U.S. Patent No. 6,193,077). Applicants respectfully traverse.

It is respectfully submitted that Witham clearly does not teach or suggest Applicants' composite porous membranes as claimed in claims 1 and 50. For example, Witham at least does not teach or suggest a porous membrane coated at its surface and inner pore surfaces with

difunctional surface-modifying molecules having molecular weight less than 10,000 Dalton. Further, it is submitted that Witham does not teach or suggest a porous membrane coated by flowing a reagent solution through a porous substrate to coat the substrate surface and inner surfaces of the pores, wherein a crosslinked hydrophilic polymeric network is provided at the substrate surface and inner surfaces of the pores of the membrane such that the pore size of the coated membrane is substantially the same as the pore size of the porous membrane before coating.

Witham describes a membrane having a coating thereon so as to impart permanent wettability without cracking. To provide these properties, the coating requires both a high molecular weight polyalkylene oxide (PEO) and a polymerizable polyfunctional monomer. Witham's high molecular weight PEO must have molecular weights of about 25,000 to 1,000,000 daltons or greater (see col. 4, lines 30-38) which is clearly outside of Applicants' presently claimed range. In particular, Witham requires materials having molecular weights more than double Applicants' presently claimed maximum range, and which can be more than 100 times Applicants' presently claimed maximum range.

In view thereof, it is respectfully submitted that claims 1, 50, and 58, and all claims dependent therefrom, are patentable over Witham. Reconsideration and withdrawal of the rejection is respectfully requested.

Witham and Steuck

Claim 20 is rejected under 35 U.S.C. §103(a) over Witham and Steuck et al (U.S. Patent No. 4,618,533). Applicants respectfully traverse.

Steuck does not remedy the above-noted deficiencies in Witham. Rather, Steuck is cited for allegedly describing porous membranes that include polyethylene and polyvinylidene fluoride. No combination of Witham and Steuck would teach or suggest Applicants' coated membranes as set forth in Applicants' independent claim 1. Claim 20 depends from claim 1 and, thus, also is patentable over Witham and Steuck. Reconsideration and withdrawal of the

rejection is respectfully requested.

Witham and Hu

Claims 18 and 50-57 are rejected under 35 U.S.C. §103(a) over Witham and Hu et al. (U.S. Patent No. 5,209,849). Applicants respectfully traverse.

Hi does not remedy the above-noted deficiencies in Witham. Rather, Hu is cited for allegedly describing the use of DROCUR® 1173 as a photoinitiator. No combination of Witham and Hu would teach or suggest Applicants' coated membranes as set forth in Applicants' independent claims 1 and 50. Claims 18 and 51-57 depend from claims 1 and 50 and, thus, also are patentable over Witham and Hu. Reconsideration and withdrawal of the rejection is respectfully requested.

Witham and Wu

Claim 10 is rejected under 35 U.S.C. §103(a) over Witham and Wu et al. (WO 00/50161). Applicants respectfully traverse.

Wu does not remedy the above-noted deficiencies in Witham. Rather, Wu is cited for allegedly describing a crosslinked acrylic coating having a pendant cationic group linked to the coating backbone. No combination of Witham and Wu would teach or suggest Applicants' coated membranes as set forth in Applicants' independent claim 1. Claim 10 depends from claim 1 and, thus, also is patentable over Witham and Wu. Reconsideration and withdrawal of the rejection is respectfully requested.

Witham and Hou

Claim 11 is rejected under 35 U.S.C. §103(a) over Witham and Hou et al. (WO 00/50160, corresponding to U.S. Patent No. 6,783,937). Applicants respectfully traverse.

Hou does not remedy the above-noted deficiencies in Witham. Rather, Hou is cited for allegedly describing a crosslinked acrylic coating having fixed negative charge. No combination

of Witham and Hou would teach or suggest Applicants' coated membranes as set forth in Applicants' independent claim 1. Claim 11 depends from claim 1 and, thus, also is patentable over Witham and Hou. Reconsideration and withdrawal of the rejection is respectfully requested

CONCLUSION

In view of the above amendment, applicant believes the pending application is in condition for allowance.

It is believed that no fees are required for consideration of this response. However, if for any reason the fee paid is inadequate or credit is owed for any excess fee paid, the Office is hereby authorized and requested to charge Deposit Account No. **04-1105**.

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Respectfully submitted,

By: /Lisa Swiszc Hazzard/
Lisa Swiszc Hazzard
Registration No.: 44,368
EDWARDS ANGELL PALMER & DODGE
LLP
P.O. Box 55874
Boston, Massachusetts 02205
(617) 517-5512
Attorneys/Agents For Applicant